The Egyptian Journal of Radiology and Nuclear Medicine (2015) 46, 1271–1278

Egyptian Society of Radiology and Nuclear Medicine

The Egyptian Journal of Radiology and Nuclear Medicine

www.elsevier.com/locate/ejrnm
www.sciencedirect.com

ORIGINAL ARTICLE

Intraductal breast masses: Sonographic and mammographic predictors of malignancy

Hesham El Sheikh [a,*], **Hesham Almohamady Almetaher** [b], **Hamdy S. Abdalla** [b], **Mohamed M. Shareef** [c]

[a] *Radiology Department, Benha University, Egypt*
[b] *Department of General Surgery, Tanta University, Egypt*
[c] *Department of Pathology, Tanta University, Egypt*

Received 29 January 2015; accepted 29 June 2015
Available online 15 July 2015

KEYWORDS

Ultrasound;
Mammography;
Breast;
Intraductal mass;
Histopathology

Abstract *Objective:* To determine the ultrasonographic and mammographic features of intraductal breast masses that may be associated with malignancy.
Patients and methods: We compared US and mammographic findings with the histopathology in 198 patients with 251 intraductal breast masses. The radiologist assessed US features of the mass, its distance from the nipple, the pattern of duct filling by the mass, whether the mass involved the branch ducts and the presence of abnormal axillary lymph nodes. The mammograms were assessed for the presence of a mass, calcifications, a mass with calcifications and asymmetry.
Results: Histopathology revealed 46 malignant masses (18.3%) and 205 benign masses (81.7%). Malignant masses were larger than benign masses, have greater distance from the nipple, commonly filled the duct completely, extended outside the duct, and involved branch duct whereas benign masses commonly filled the duct incompletely and none extended outside the duct or involved branch duct. On mammography, clustered microcalcifications were commonly associated with malignant masses.
Conclusion: Intraductal masses completely filled duct, extended outside the duct or involved branch ducts, its distance from the nipple is >15 mm or associated with abnormal axillary lymph nodes on US or microcalcifications on mammography, and all these findings may be associated with malignancy.

1. Introduction

Breasts are made up of lobules (milk-producing glands) and ducts (tubes that carry milk to the nipple), which are surrounded by glandular, fibrous and fatty tissue. Intraductal breast masses are either solitary or multiple intraluminal lesions that develop

* Corresponding author at: Benha University, Benha, Egypt. Tel.: +20 1010023633.
E-mail address: Heshamus@hotmail.com (H. El Sheikh).
Peer review under responsibility of Egyptian Society of Radiology and Nuclear Medicine.

http://dx.doi.org/10.1016/j.ejrnm.2015.06.020

in one or more of the lactiferous ducts of the breast. They are usually close to the nipple, but can sometimes be found elsewhere in the breast. The patient may feel a small painless lump or notice a discharge of clear or bloodstained fluid from the nipple (1,2). A mass within a dilated duct can be either malignant such as ductal carcinoma in situ (DCIS) and invasive ductal carcinoma (IDC)) or benign such as debris, papilloma, fibroadenoma and atypical ductal hyperplasia (3).

Recent advances in breast US technology using high-resolution transducers (10–13 MHz), have enabled US to clearly visualize the ductal system and have allowed the detection of intraductal masses (3). US is more specific than galactography, mammography and MRI in the assessment of intraductal masses and may be considered as the modality of choice (4–7). US can reveal a solid oval, round, or microlobulated mass in a fluid-filled duct. On mammography, a round, well-circumscribed mass, which may contain calcifications, can be seen in the subareolar region. Often US, and mammography are non-revealing. Galactography can depict an intraductal or intraluminal filling defect (8).

A standardized lexicon for breast US was developed in 2003 by the American College of Radiology in light of the increasing use of US in clinical practice. Like its mammographic counterpart, the sonographic Breast Imaging Reporting and Data System (BI-RADS) lexicon was intended to provide a unified language for sonographic reporting and research and to avoid ambiguity in the communication and teaching of sonographic interpretation (3). According to the BI-RADS system, intraductal masses are one of the ''special cases'' and it is still not clear whether all intraductal masses detected by breast US should be classified into BI-RADS category 4A because there are no definite clinical and radiologic predictors for malignancy (3).

To our knowledge, only one study has assessed the final outcomes of intraductal masses detected by breast US aiming to define the clinical and radiologic predictors for malignancy (3). However, most of intraductal masses detected in this study were confirmed by histopathologic examination using core needle biopsy or vacuum-assisted biopsy and surgical diagnosis was made for small number of cases. Thus, there are possibilities of false-negative results from these biopsy procedures that result in underestimation of the malignancy rate and affect the final outcome (3).

Therefore, it would be useful to identify the factors involved in predicting the presence of malignancy within intraductal breast masses based on surgical pathologic diagnosis to obtain more accurate results.

For this reason, we compared the sonographic and mammographic features of intraductal breast masses with the histopathological results obtained after surgery aiming to determine which sonographic and mammographic variables of these masses may be associated with malignancy.

2. Patients and methods

2.1. Patients

At our institution, breast US is a basic examination for all patients referred for any radiological breast study. Breast US can be performed as a requested study or as a complementary examination for mammography or MRI. Out of the 9534 patients who underwent 19,513 US breast examinations between March 2010 and September 2014, breast US suggested the presence of intraductal masses in 215 patients. Of these, surgery was performed for 200 patients followed by histopathological examination which proved the presence of intraductal masses in 198 patients. Among the remaining 15 patients, 9 patients refused surgery and 6 patients underwent US without mammography due to lactation. The inclusion criterion for this study was histopathologically-proven intraductal masses in patients who underwent both breast US and mammography followed by surgical excisional biopsy. Therefore, this study included 198 patients and the remaining 17 patients were excluded (two patients with negative histopathology after surgery, 6 patients who underwent breast US only and 9 patients who refused surgery). Among the 198 patients, 19 patients had two lesions and five patients had three lesions. Thus, 251 intraductal masses from 198 patients were retrospectively included in this study. All patients were females and their ages ranged from 24 to 73 years (median age, 38 years).

3. Methods

All patients underwent a clinical breast examination before breast US and mammography. The mammograms were performed using a LABDA/GMI (General Medical Italy) mammography system (LABDA/GMI, Italy). Standard craniocaudal and mediolateral oblique views were routinely obtained, and additional mammographic views were used as needed.

Breast US was performed by an experienced radiologist using a scanner (Mindray DC-7) and a scanner (Medison SONOACE R7), both scanners with 5–12 MHz linear-array transducers. US of both breasts was performed first by scanning each breast in the transverse and sagittal orientations, inner aspect of the breast in a supine position, and outer aspect in supine oblique position with the patient's arm raised above the head. The radiologist assessed the presence of breast masses, the lactiferous ducts and periductal area, and the axillary tail followed by scanning the axilla. In cases of palpable abnormality, targeted scanning at the area of concern was performed: the radiologist palpated the lesion before and during scanning of the lesion.

Meticulous scanning of the periareolar region was performed after optimization of the sonographic parameters as follows: frequency (FR) = 12, frame rate (FR) = 9 Hz, Dynamic range (DR) = 60–75 with lower values for dense breast tissue and higher values for normal breast tissue, Gain (Gn) = 80–95, Focus position = 2. We used generous amount of gel at the areolar region together with light compression of the probe and scanning is done laying the probe in parallel with the long and short axes of the lactiferous duct. In patients with retracted or deformed nipple obscuring the retro-areolar region in supine position, examination was better performed in supine oblique position for better delineation of the ducts.

The assessment of US and mammographic findings was done separately by the same radiologist who was blinded about the final diagnosis obtained after histopathological examination.

The mammograms were assessed for the presence of calcifications, mass (localized abnormal density), a mass with calcifications and asymmetry (9).